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AUTHOR	Bottoms, Gene
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ABSTRACT

Since 1987, more than 1,100 high schools in 35 states have adopted the High Schools That Work (HSTW) improvement design. The effectiveness of selected school and classroom practices included in the HSTW design was analyzed to identify implications for federal policy, the conditions that improve students' chances for success, and practices that raise student achievement. The following are among the recommendations for policymakers that emerged from the study: (1) achieve better alignment of federal and state initiatives for low-performing schools; (2) encourage tougher graduation policies; (3) encourage an academic or career focus; (4) build curriculum and instructional leadership capacity at the school level; (5) designate federal resources to support extra help and successful transition; and (6) place major emphasis on professional development as the key to school improvement. The following conditions were identified as improving chances for success: graduation and accountability policies; outside assistance; alignment of district leadership, policies, and resources; and a focus on curriculum, instruction, and student achievement. The following practices were deemed effective in raising student achievement: realizing a functional school mission; having students complete a rigorous academic core and concentration; setting high expectations; rethinking the purpose of career and technical studies; and offering high-quality structured worksite learning. (Contains 40 tables/figures.) (MN)

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Raising the Achievement of Low-Performing Students:

What High Schools Can Do

Gene Bottoms

Southern Regional Education Board

High Schools that Work

April 2002

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Raising the Achievement of Low-Performing Students: What High Schools Can Do

Gene Bottoms

Introduction

Since 1987 the Southern Regional Education Board, in partnership with states, has used a comprehensive school reform design to improve the achievement of career-oriented high school students.[1] At the outset of the *High Schools That Work (HSTW)* initiative, almost all career-oriented young people in the high schools we served were low performing. In many instances, the schools themselves could be considered low performing. Today, more than 1,100 high schools in 35 states have adopted the *HSTW* improvement design and the gains in student achievement are promising. More than 50 high schools that have been in the network since the early- to mid-1990s have 85 percent of career-oriented students meeting performance goals in reading, mathematics and science and at least two-thirds completing the *HSTW*-recommended curriculum. These schools demonstrate what is possible when educators commit to an improvement design and "stay the course" in pursuing the vision over a period of time.

High Schools That Work has amassed information about the impact of certain school and classroom practices on the achievement of career-oriented students through its biennial assessment of graduating seniors at *HSTW* schools. National Assessment of Educational Progress-like exams in reading, mathematics and science and student surveys about their experiences in high school, conducted every two years since 1988, have enabled us to document the impact of recommended course-taking patterns and other practices on student achievement. The number of students completing the challenging curriculum has increased. *(See Table 1.)* There has been a corresponding rise in the percentage of students who meet *HSTW* academic performance goals[2] at network schools.

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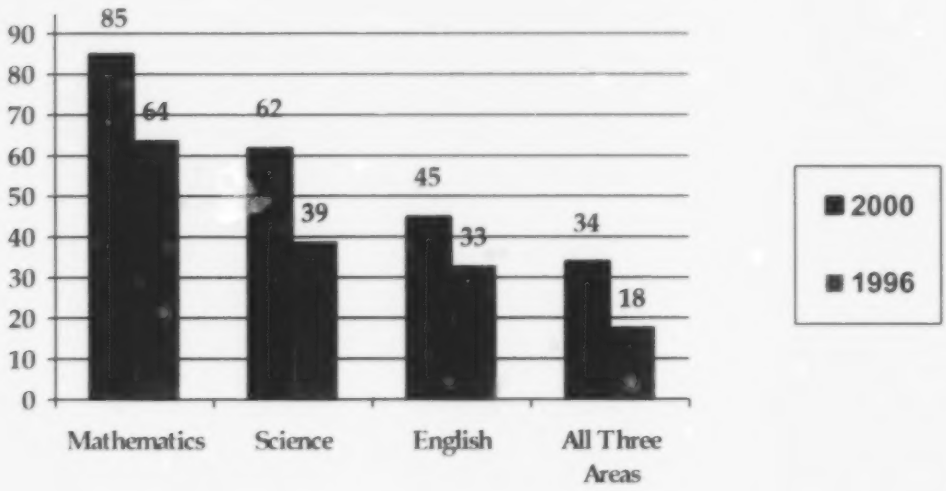
[1] Career-oriented students are those who upon completing high school will enter the military, a community or technical college, a four-year college with non-competitive entrance requirements, employment or a combination of employment and further study.

[2] *High Schools That Work* performance goals have been set high enough for students to pass employer exams for better jobs and to greatly increase their chances of pursuing further study without having to take remedial courses.

The percentage of students meeting the goals at sites who have been in the network since 1996 rose between that assessment and the latest one conducted in 2000 from roughly two-fifths of all students to between one-half and three-fifths of all students. *(See Table 2)*

Table 1
Percentage of Career-Oriented Students Completing the *HSTW*-Recommended Academic Curriculum



1996 and 2000

Table 2
Percentage of Students Who Met *HSTW* Performance Goals At Experienced Sites*

	Reading	Mathematics	Science
1996	43%	44%	39%
2000	51	61	55

* Sites that were members of the network throughout this period.

This progress has come about because career-oriented students have experienced more challenging curriculum and engaging instruction and received better guidance and extra help to meet higher standards and expectations.

We are currently working with more than 100 low-performing high schools that have received support through the U.S. Department of Education's Comprehensive School Reform Demonstration (CSRD) program. These schools have adopted *HSTW* as their school improvement design. Our experiences with these schools over the past three years have allowed us to learn additional lessons about what is necessary to help our nation's most challenged high schools improve for all students.

The demands for workers with higher levels of literacy, numeracy, higher-order thinking skills, the ability to use technology and other high-level skills are dramatically affecting all levels of education. Nowhere is this more evident than in American high schools, where policies and embedded practices have anointed some students for great success and others for smaller roles in our society. In many cases, students have been "written off" and allowed to wander through school with little or no direction, minimal effort and few expectations.

Fifteen years ago when the *HSTW* initiative was founded, many students in career/technical programs were among the latter group. Many of the schools joining our network have adopted a different view of these students and their capabilities for success. The results have followed. The number and percentage of schools posting improved scores on the NAEP-like *HSTW* Assessment increased dramatically from 1996 to 1998 compared with growth from 1994 to 1996. *(See Table 3.)*

Table 3
***HSTW* Schools With Increases in Performance Scores**

	Number of Schools	Percent of Schools with Increases in Scores		
		Reading	Mathematics	Science
1994 to 1996	260	49%	60%	53%
1996 to 1998	444	63	85	82

The change in attitude that has fostered these improvements is in keeping with the facts about today's career/technical graduates. More than 60 percent of them pursue postsecondary education rather than go directly into full-time entry-level jobs. Further education is necessary to equip today's high school graduates with the skills they need to compete in the new economy. Projections show that by 2020, 85 percent of jobs will require some education beyond high school. **High schools must therefore look at how they can prepare many more graduates for success in both further study and employment.**

Meeting *HSTW* Performance Goals: What Students Know and Can Do

Reading

- Seek and use information from manuals, journals, periodicals and other documents
- Use information from several sources to make interpretations and draw conclusions
- Identify and solve stated problems
- Recognize limitations in available information

Mathematics

- Understand concepts from algebra, geometry and probability
- Apply concepts from algebra, geometry and probability in solving multi-step problems
- Explain reasoning in a number of problem-solving situations

Science

- Apply knowledge, skills and reasoning to interpret scientific and technical data from tables
- Make inferences about outcomes of experimental procedures
- Evaluate the appropriateness of an experiment's design
- Interpret scientific text and graphs

This paper addresses three questions from *HSTW* research and experiences over the past 15 years in raising student achievement in low-performing high schools:

- What are the implications for federal policy?
- What are the conditions that improve the chances for success?
- What practices work in raising student achievement?

What Are the Implications for Federal Policy?

Our work has caused us to draw some conclusions about the role the federal government can play in improving high schools. In this paper, we begin with the implications we see for federal policy. Following this summary, we show facts about the conditions and practices at schools in our network, which have resulted in higher student achievement. These findings have led us to make these recommendations.

Achieve Better Alignment of Federal and State Initiatives for Low-Performing Schools

Most states have identified very few high schools as "low performing" because they limit this designation to schools that have the very lowest performance based on state tests and other measures of achievement. Some states have organized efforts to assist low-performing schools. However, many schools that could benefit from outside assistance are excluded because they do not meet the state's definition of "low performing". Future federal legislation **directed toward school improvement** should require a common state and federal definition of "low performing" as a condition for receiving federal funds.

States should also be required to develop plans for using the CSRD initiative and for working with providers to align state policies with the adopted improvement design and to deliver technical services to many more "challenged" schools. This may require federal legislation to encourage states in developing special policies for challenged schools and in preparing cadres of highly experienced educators who will work with service providers in assisting low-performing schools. In addition, future career/technical legislation could strengthen the role of state staff in assisting high schools to improve the quality of both academic and career studies.

Encourage Tougher Graduation Policies

The states that are making the most progress in raising student achievement and changing beliefs about students' capacity to learn are those that have adopted tougher graduation policies. These include expecting all students to complete an academic core as recommended by *HSTW* and outlined in this report. States at the forefront of school reform efforts have adopted demanding state assessments that count both for students and for schools. When accountability becomes "high stakes" for all parties, improving school and classroom conditions and practices with the goal of raising student achievement is taken seriously by everyone. National policies can strongly encourage such state policies by giving incentive dollars to those states that put them in place.

When state graduation requirements are less rigorous than those recommended by the improvement design a school has selected, districts often are reluctant to put higher requirements in place. This situation can be addressed if, to receive federal dollars for a particular school-reform design, a local school board is required to adopt high school graduation policies that are compatible with those of the improvement design. When current standards are lower than those of the design, many high school leaders – even with outside support – are unwilling to confront deeply held beliefs about students' capacities to learn.

Encourage An Academic Or Career Focus

Encouraging tougher graduation policies that get more students to finish a challenging academic core is certainly one step to improve the achievement of career-oriented students and the achievement of students in low-performing high schools. However, federal vocational legislation can encourage states to have more students to finish, in addition to the challenging academic core, either more high-level academic courses or a coherent series of planned career/technical courses. Continually in the *HSTW* data, we find that students who take a solid academic core and either more academics or quality career/technical studies are the highest-achieving high school graduates. Encouragement of a focus beyond a challenging academic core will serve to tone up the senior year. Federal policy can encourage states to look at ways that postsecondary resources, both in academic and technical studies, can be used to supplement local districts' efforts to give students access to challenging studies during their last year of high school.

Require Districts to Align Resources to Support a Reform Design

Despite a sizeable federal investment in the CSRD program, the funds available to any individual high school often are not adequate to bring about the kinds of pervasive changes that low-performing schools need to make. Moving to a new type of school schedule, offering extra support classes for students including catch-up classes in grades nine and grade 12, and additional support outside the school day all require more staff and resources. Support is also needed to pay for the costs of extra time required to build consensus among teachers for the reform effort, to allow teachers to do common instructional planning and to provide "coaching" and extensive staff development to upgrade content and instructional methods. Unless all resources – federal, state and local – are aligned toward the achievement of the improvement goals, schools will continue to grapple with how they can fund needed improvements. When district resources are not allocated to supplement and support the design being funded with federal resources, school leaders are left to wonder whether the district truly supports their efforts.

Future legislation should require school districts to describe how they will align other funding, other improvement initiatives, technical assistance, staff development and extra help to fully implement the design. Improving curriculum, instruction and student assessment is a challenging and often costly task that must be fully supported by directing all resources toward common goals.

Build Curriculum and Instructional Leadership Capacity at the School Level

School improvement is a local school-by-school initiative that requires highly qualified and well-prepared school leaders. Strong emphasis is needed in future school improvement legislation on developing current and aspiring school and teacher leaders to lead changes in

curriculum, instruction and student achievement. Make support for leadership development programs a priority.

Students' literacy and numeracy performance is a major national concern that requires a concerted approach. Federal dollars can be directed toward an effort to have individuals within each school who are dedicated to assisting all teachers to use reading, writing and mathematics strategies for advancing student achievement in their disciplines and at the same time to strengthen students' mastery of these vital skills.

Designate Federal Resources to Support Extra-Help and Successful Transition

As high school graduation requirements increase and more states use high stakes exams, failure rates will rise in grades nine and 10 and drop-out rates will increase unless middle grades and high schools work together to provide more students the help they need to successfully meet higher standards. While more high school graduates are pursuing postsecondary studies, many of them are not successful because of the failure of high schools and postsecondary schools to work together to address the problem. Students can meet higher expectations if they are provided extra time and help to meet the demands of a challenging high school curriculum.

Future federal legislation should specifically call for schools to use federal and state/local matching resources to establish support classes during the school day and tutoring programs before and after school, on Saturdays and in the summer to help those students who need such assistance. It must also encourage the state and local school districts to provide leadership for collaboration between middle grades and high school leaders and between high school and postsecondary leaders to increase the percentages of students who move successfully from one level of education to the next.

Place Major Emphasis on Professional Development as the Key to School Improvement

The success of any school-improvement effort is heavily dependent upon providing educators the professional development they need to implement new programs and practices. Support is needed both in strengthening content knowledge and in learning new teaching strategies and approaches to help students learn more challenging materials. Providing adequate time for professional development may mean that some educators will need to be given extended contracts that pay them for working after school hours and during the summer to strengthen their own skills and to work together to plan new curriculum and instruction.

Make Teacher Preparation a High Federal Priority

There is a growing national shortage of teachers that is reaching crisis proportions in some areas. The need for qualified mathematics and science teachers and the need for incentives to attract qualified teachers to low-performing schools are special concerns.

Federal investment is needed to: 1) upgrade the academic foundation of career/technical teachers; and 2) prepare and certify a new generation of teachers who know how to integrate academic standards into their curriculum and develop and use classroom assessments to evaluate students' academic and technical achievement. Federal policy and resources can help states develop a new generation of career and technical teachers by:

- Supporting innovative approaches to recruit degreed persons as teachers;
- Encouraging states to develop certification standards that require teachers to have a strong 1) general education foundation with special emphasis in mathematics and science; 2) industry–specific knowledge and general workplace skills; and 3) the ability to use a framework of instructional practices to integrate academic and technical studies.
- Encouraging states to adopt a comprehensive set of professional teaching standards. States need the flexibility to direct their federal resources to teacher preparation and to helping teachers meet the highest professional standards through special induction support for new teachers.

Invest in Assessing Student Learning through Career and Technical Courses

Completing a quality high school career and technical program can add value to academic achievement by advancing the technical literacy achievement of students. Some states are making a concerted effort to assess whether or not students completing a planned sequence of career/technical courses can:

- Read, comprehend and interpret technical information in a chosen field of study;
- Solve the typical mathematics problems they will encounter as they enter and advance in their fields of study;
- Demonstrate understanding of foundational technical concepts needed for further learning.

Most of the exams developed by states have been created with limited investment and may not stand the test of validity and reliability necessary to count for students and program accountability. Yet, exams that count hold a great deal of promise for shifting the focus of high school career/technical studies **toward advancing students' technical literacy achievement.** Future federal legislation can make advancing technical literacy achievement

the primary purpose of high school career/technical studies and can make exams to assess it a priority for investment.

Support the Creation of New Career/Technical Schools with a Priority on Urban Areas

According to national studies, students in urban areas have less access to occupational-specific career/technical courses. As access to quality career/technical courses declines, we are also seeing a drop in the number of students earning a high school diploma. Many low-skill, low-demand programs remain while the kinds of high-skill, high-demand programs offering the best career paths – such as pre-engineering, computer-aided design, computer-aided manufacturing and information technology – often are not offered. Federal legislation can address this shortage by providing support for new "choice" high schools that will teach students a solid academic core around a career focus. These schools might be charter schools, polytechnic high schools, career academies or schools located on the campuses of technical colleges or universities. *HSTW* data clearly show that many students thrive in an environment that allows them to pursue a strong academic core with course work aligned to a career focus. Regardless of their setting, these schools must be adequately funded, held accountable for results, and have a site-based governing structure.

What Are the Conditions that Improve the Chances for Success?

The environment in which a school operates makes a great deal of difference in efforts to improve. Key conditions that matter include: state high school graduation and accountability policies; commitment to a school improvement design and support from experienced intermediaries in achieving it; alignment of district policies, initiatives and resources to the improvement design; focus of district, school and teacher leadership on improving curriculum, instruction and student achievement; and quality teachers and instruction.

Graduation and Accountability Policies

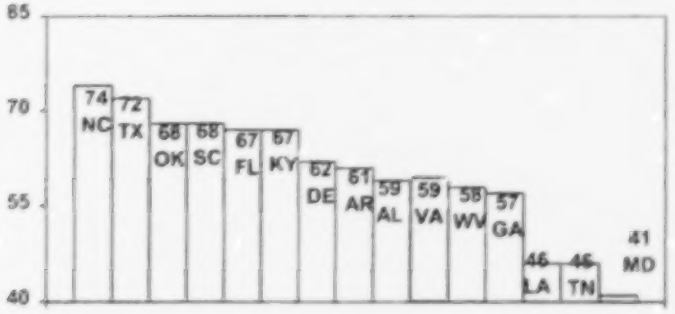
High schools in states with more demanding high school graduation standards make more progress in advancing student achievement than schools in states with less rigorous standards. Policies mandating the completion of rigorous course requirements for graduation, external exams that count, and accountability measures that encourage continuous school improvement make a significant difference. Local system school and teacher leaders in states with these types of policies are more intent on using a comprehensive school reform design to improve student achievement than are leaders from states where they do not have the "stimulus of state policy." For example, in states with stringent graduation policies, a higher percentage of students are meeting *HSTW* achievement goals.

HSTW assessment data show that small gains in student achievement are made simply by requiring students to take more mathematics and science courses for graduation, without regard to rigor. However, much greater gains in achievement occur when students are required to take more college-preparatory-level mathematics and science courses and four years of college-preparatory English courses taught to the same standards that the schools historically set for their best students. Even greater effort is made to teach these courses to high standards in states where end-of-course exams in selected core academic areas count toward course grades or graduation or students have to pass a graduation exam.

For example, nine SREB states require students to complete three or more mathematics credits including Algebra I and geometry – Alabama, Arkansas, Delaware, Kentucky, Oklahoma, South Carolina, Texas, Virginia and West Virginia. On the 2000 assessment, these states had a higher percent of career students at *HSTW* schools meeting the mathematics performance goal than was the case in Maryland and Tennessee, two SREB states that did not require both Algebra I and geometry for graduation nor any type of exam. However, Louisiana is an exception. They did require both Algebra I and geometry but remained a low-achieving state.

Students at *HSTW* schools in three states – North Carolina, Florida and Georgia –do not require both Algebra I and geometry but require students to take either end-of-course exams in selected academic areas or rigorous high school graduation exams. In some instances these states have higher achievement than do states that require both algebra and geometry. (*See Table 4.*)

Table 4
Percentage of Students at *HSTW* Schools Meeting Mathematics Goal By State



Source: 2000 *HSTW* Assessment

Note: *HSTW* does not claim that the schools or students are comparable. This table represents the percent of career-bound students at *HSTW* sites who met our mathematics performance goal. Student performance appears to be influenced by state testing, policies or accountability and courses required for high school graduation.

Achievement is even better if the state establishes policies to make full use of the senior year of high school by requiring all students to complete a challenging academic core and either an academic or a career/technical concentration of at least three or four credits. A requirement that students complete a challenging academic core and a concentration results in students being enrolled in more rigorous courses in the senior year and ends the general diploma option. Requiring a concentration enables all students to choose an area – such as mathematics and science, humanities and foreign language or a career – for in-depth study. Such concentrations will contribute to advancing student achievement if students are expected to take some type of external exam that counts as part of the final course grade – Advanced Placement exam, National Employers' Exams or postsecondary exams for awarding credit for joint enrollment courses.

Two states offer compelling examples of the power of strong state policies to affect student achievement. The Georgia State Board of Education, in the mid 90s, ended the general track and required all students to take a more demanding academic core and either a career focus or more advanced academic courses. The state has witnessed an increase in the percentage of students completing the college-preparatory endorsement, the vocational endorsement and the dual vocational and college-preparatory endorsement while eliminating the general diploma. *(See Table 5.)*

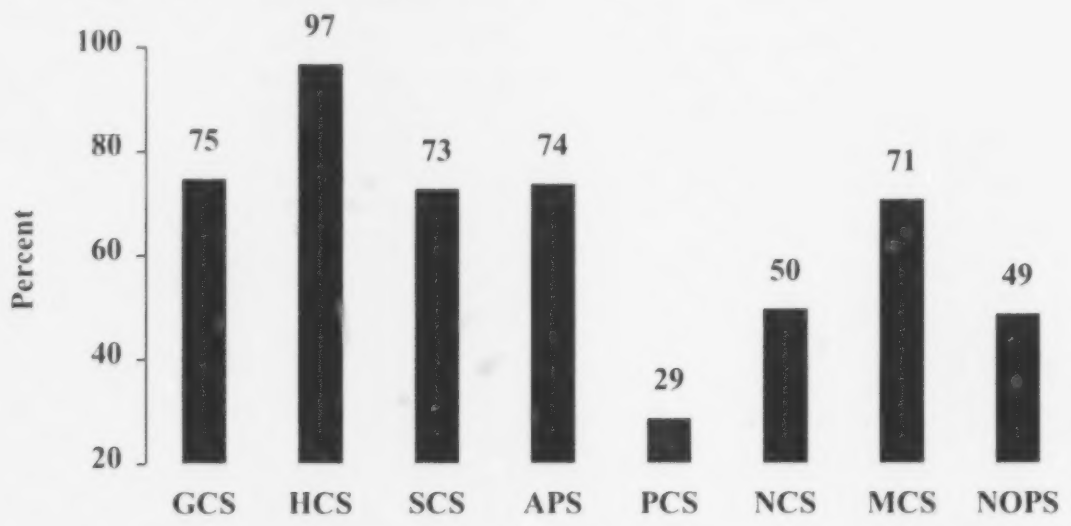
Table 5
Georgia Graduates by Type of Diploma

	1997		1999	
	#	%	#	%
Diplomas with College Prep Endorsements	29,249	48	32,191	49
Diplomas with Vocational Endorsements	10,737	18	14,962	23
Dual College Prep and Vocational Endorsements	7,095	11	10,799	17
General High School Diplomas	10,203	17	1,249	2
Special Education Diplomas	1,712	3	2,055	3
All Diplomas	58,996	97	61,356	94
Certificates of Performance	2,008	3	4,192	6
All Graduates	61,004	100	65,548	100

Source: GDOE Report Cards

Because of state policies in Alabama that require four years of mathematics and science, there have been significant differences in mathematics and science course-taking patterns and achievement of African-American students in Huntsville, Alabama compared to African-American students in other districts in the *HSTW* urban network. *(See Tables 6 and 7.)* Huntsville scores were the second highest of any of the urban districts. Only African American students in Greensboro, North Carolina, with the state's long emphasis on end-of-course exams in core academic areas, had higher average scores. Without the state policies, at least half of the African-American students in Huntsville would not be enrolled in mathematics and science in the senior year.

Table 6
Making the Senior Year Count
Percentage of African-American Students Taking Mathematics as Seniors and Average Achievement in *HSTW* Urban Districts

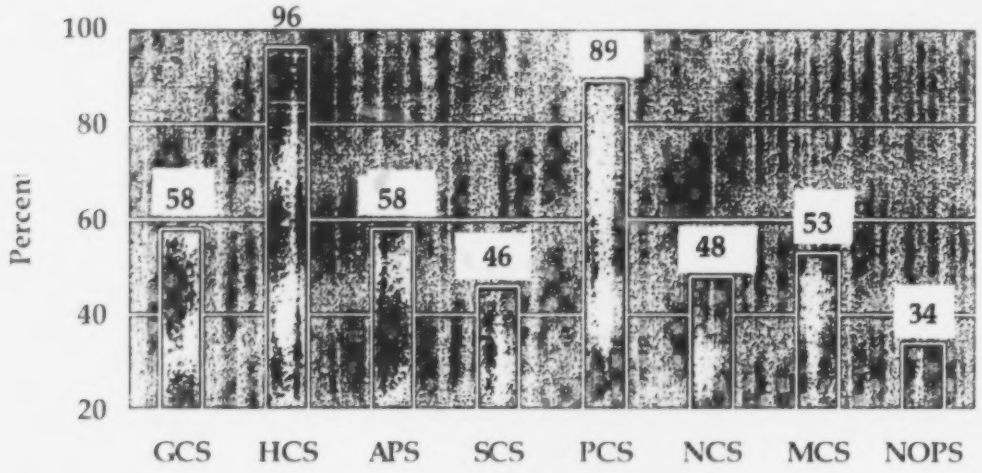


Average Scores: 312 304 294 292 286 284 277 268

Source: 2000 *HSTW* Assessment

Key for Chart:
APS – Atlanta Public Schools; GCS – Greensboro –Guilford County Schools;
HCS – Huntsville City Schools; MCS – Memphis City Schools; NCS – Nashville City Schools;
NOPS – New Orleans Public Schools; PCS – Philadelphia City Schools; SCS – Savannah City Schools

Table 7
Making The Senior Year Count
Percentage of African-American Students Taking Science as Seniors and Average Achievement in *HSTW* Urban Districts



Average Scores: 303 290 279 272 269 268 262 253
Source: 2000 *HSTW* Assessment

Key for Chart:
APS – Atlanta Public Schools; GCS – Greensboro –Guilford County Schools;
HCS – Huntsville City Schools; MCS – Memphis City Schools; NCS – Nashville City Schools;
NOPS – New Orleans Public Schools; PCS – Philadelphia City Schools;
SCS – Savannah City Schools

The desire to make continuous improvement in student achievement is stronger where local school and system leaders face sanctions if they fail to show evidence of improvement in student achievement over a given period of time, or receive rewards if they do. In the absence of a compelling need to teach all students to the same high standards to which the best students have been historically taught, it will take more time and resources to reform low-performing schools. Graduation and accountability policies provide the "cover" necessary to confront a widely held belief by educators and the public that many students simply are not capable of learning at higher levels.

Most Low-Performing Schools Need Outside Assistance

Higher graduation standards and accountability provisions are not enough. Low-performing schools need outside technical assistance to improve, and many high schools that are not considered low performing need help to improve the performance of their low-

performing students. The amount of needed technical assistance varies in direct proportion to the quality of the school's and system's leadership.

Current funding available from federal sources is usually not adequate to obtain the level of on-site technical assistance, coaching and professional development needed to achieve rapid improvement in student achievement. This is made especially difficult in states that have failed to align their state and local low-performing school-improvement initiatives with federal initiatives, such as the CSRD effort.

State support to schools in implementing improvements is limited. SREB has witnessed a larger percentage of *HSTW* network schools making improvements in states that have made providing technical assistance and coaching for high school reform a primary responsibility for their entire career/technical staff. States that have limited the amount of technical assistance to either a full- or partial-assignment of one individual have a lower percentage of their *HSTW* sites making progress. Too few states are using the full potential of their federal vocational dollars to encourage high schools to improve the quality of both academic and career studies provided to students.

Kentucky and North Carolina have experienced success with low-performing high schools with the selection, development and assignment of a highly experienced educator (Kentucky) or a team of highly experienced educators (North Carolina) to work with low-performing schools over an extended period of time. In both states, the schools that have received such support have been able to improve student performance. Of the 53 schools selected initially to participate in the Kentucky School Transformation, Assistance and Renewal (STAR) program, all reversed their downward trend after two years, and 63 percent exhibited student growth in excess of the expected rate established for their school. In the second cycle, 91 percent of approximately 200 schools reversed their downward trend after two years. In North Carolina, although a smaller number of schools have received assistance, results have been no less impressive. After one year, two of three high schools that were assigned assistance teams reached exemplary status, while the other made expected progress. These types of initiatives need to be implemented in all states.

Another problem is the lack of a strong common definition for what constitutes a low-performing school. Currently, states' criteria for identifying low-performing schools are based on student performance and are set at a very low level with few schools being identified as low performing. These definitions are far more restricted than the definition in federal legislation to qualify for a CSRD grant. The result is that state efforts to assist low-performing schools are not aligned, either by definition or in providing services, to schools approved for federal CSRD grants. Too few states have made the CSRD initiative an integral part of their strategy to aid low-performing schools and some states do not have any initiative for assisting low-performing high schools.

Alignment of District Leadership, Policies and Resources to the Chosen Design

More progress is made in low-performing schools when it is evident to school and teacher leaders that the district leadership is behind the reform effort. Leaders gain confidence that it is an important initiative that will not "go away" when they see a continuum of policies, technical assistance and resources being provided to support the school as it implements the design.

Districts that allow schools to adopt a school improvement design and continue to launch a series of unrelated "Christmas tree" initiatives with little follow-through will experience little success. It is an unusual school leadership team that can pick and choose from the district's several initiatives and use them to support the reform design chosen by the staff, especially if the district leadership cannot be focused. School districts must develop policies, staff and resources to support each school's effort in improving student achievement. Without such alignment, outside providers of technical assistance and staff development services often find themselves competing with the district for time and attention of school leaders and teachers.

System and School Leaders Focus on Curriculum, Instruction and Student Achievement

Chances of success are greatly increased if system, school and teacher leaders have a deep understanding of curriculum and instruction and a commitment to apply their knowledge to advance student achievement. In most instances, principals of low-performing high schools have been chosen for reasons other than their ability to lead change in what and how students are taught and to what standards.

To succeed in such a situation, schools must choose one of three options:

- Replace the principal with a leader with passion for student achievement, a proven record of raising achievement of low-performing students, an ability to work with others, and a record of high performance using data-driven decision-making skills.
- Commit both system and school leaders to participate in a series of leadership development efforts, forming a team of teachers and aspiring school leaders committed to solving curriculum, instructional and student achievement problems in the school.
- Assign a dean or assistant principal for instruction to work with a team of teachers and school leaders and give this person the authority to make necessary changes in curriculum, guidance, scheduling and organizational structure while leaving the principal responsible for discipline and other school management functions.

Schools in our network that have experienced the greatest progress in raising student achievement credit much of their success to the work of a school leadership team – principal,

assistant principal and teacher leaders. The effectiveness of these teams can be greatly improved if they participate in a leadership development program that focuses on a set of topics that will help the team apply new knowledge and skills to address real problems in the school. These topics include:

1) Using data to create the sense of urgency for change;
2) Learning effective strategies for leading change;
3) Understanding how to move standards into instruction by changing what teachers do, student assignments and classroom assessment strategies;
4) Participating with teachers as they learn classroom management strategies and research-based student instructional strategies and supporting them in implementing and refining these new methods;
5) Learning and applying effective adult learning strategies to the continued growth and development of teachers and other staff;
6) Refining and acting on a set of "basic messages" for students, teachers, parents and the community about the school's plans for raising student achievement;
7) Creating a more personalized learning environment where students take responsibility for their own learning.

Without a knowledgeable school leadership team that shares a common vision of effective school and classroom practices, high school teachers are often encouraged to teach the wrong content in the wrong way. Doing the wrong things more intensely brings little improvement in student achievement and results in greater student boredom, absenteeism and dropout rates.

Quality Teachers and Instruction

The chances for success are improved if schools can increase the number of teachers who have deep knowledge of subject matter and use instructional methods that effectively engage students in learning. Every high school has a core group of effective teachers who know their subject matter and are motivated to teach it well. Yet low-performing high schools have far more teachers who are limited in their knowledge, preparation and experiences. Many are teaching out of their fields. Such schools are often hampered by contractual arrangements that provide limited time for staff development, teacher coaching and team instructional planning that could increase teachers' knowledge and skills.

To reverse this situation, it is necessary to:

- Find the most effective teachers and allow their classrooms to become demonstration and coaching classrooms for other teachers.
- Change the school climate from one of hopelessness and despair into a climate of hope and possibility in order to motivate all teachers to perform at their best.
- Create a system of support and "coaching" for inexperienced teachers and for teachers having difficulty in classroom management in how to develop effective instructional

plans and engage students in challenging assignments. Mentoring and sharing are essential for new and out-of-field teachers.

- Organize teachers into instructional planning teams for the purpose of designing lesson plans, assignments given to students, and student assessments; and for reviewing student work and effective instructional methods, all aimed at teaching more challenging content to more students.
- Provide continuous and consistent staff development to upgrade teachers' knowledge of content, resources and effective research-based instructional strategies and their use of technology for instructional purposes, all aligned to the school improvement plan.
- Have the courage to remove teachers who are not willing to "get with the program."

HSTW has found that career/technical teachers face a special challenge that must become a staff development priority. While integration of academic content and standards into career/technical courses has been a federal goal for more than a decade, it has not been adequately addressed. Many career/technical teachers lack the academic foundation necessary to achieve this goal. More than 40 percent of over 9,000 career/technical teachers participating in the biennial *HSTW* faculty survey indicated that they neither have the academic foundation nor the instructional pedagogy for devising learning experiences that require students to draw upon their academic knowledge and skills to complete authentic tasks. Most states have failed to make the investments necessary to upgrade the academic foundation of career/technical teachers and to help them acquire the instructional methods and skills for integrating academic and technical content. Part of the reason they have not done this is that the federal legislation itself has not made this a priority for federal dollars.

Current school reform at local and state levels devotes too little time, resources and effort to improving the quality of teachers and teaching. Chances for creating a high school with the right set of school and classroom practices are greater if school leaders and teachers are expected by policy to learn how to teach more students to higher standards in both academic and career/technical classrooms. Furthermore, schools need outside technical assistance, professional development and resources to build their capacity to accomplish this goal and to transform a climate of low expectations into one of high performance.

What Practices Work in Raising Student Achievement?

To improve student achievement in low-performing high schools, leaders and teachers must be willing to change what the school sees as its basic mission, what and how students are taught and what is expected of students. This will require them to address how the school uses time and other resources and how teachers relate to students, each other, the home and the community. In addition, they must be prepared to keep track of progress and make changes when results show that different approaches and strategies are required.

Realizing a Functional School Mission

Too often, low-performing high schools are just satisfied with making it through each day and getting some students through high school. School leaders, with the help of the business community and higher-education officials, must educate students, faculty and parents about the inadequacy of this mission in preparing students to succeed in a global information-based economy.

High schools must do a better job of preparing students for both work and postsecondary studies. Getting students to take a challenging program of studies matters in assuring postsecondary attendance and success. A follow-up study of *HSTW* career-bound graduates from the class of 1996 revealed that 60 percent of the graduates enrolled in further study. Eighty-three percent of the students completing the *HSTW*-recommended curriculum and meeting the performance goals were enrolled in postsecondary study compared to 56 percent of students who failed to complete all parts of the recommended curriculum. Other studies in Oklahoma, West Virginia, North Carolina and South Carolina showed that students meeting *HSTW* curriculum and performance goals who attended community colleges had a significantly higher retention rate and grade point average at the end of one year of study than did other recent high school graduates.

The challenge for high schools is to prepare more graduates each year who can continue with further study without having to take remedial courses and can pass employers' exams for good jobs. This functional and measurable mission should be emblazoned on the front of every high school and in each classroom, referred to in every interaction with students, parents and the community, and become the focus of all school improvement efforts. Making such a mission statement operational is one characteristic that separates low-performing high schools that have become high-performing schools from those that have failed to improve.

Having Students Complete a Rigorous Academic Core and a Concentration

The one change in school practices that has the greatest impact on achievement is to give every student the opportunity to complete a challenging academic core and either more academics or a career concentration (*See box on next page.*) As low-performing high schools in the *HSTW* network increase the proportions of students completing the recommended academic core, they witness a corresponding rise in student achievement as measured by NAEP-like exams in reading, mathematics and science.

Recommended Academic Core for Challenged High Schools

Four years of college-preparatory English that requires students to do frequent reading and writing at grade-level standards.

Four years of mathematics, beginning with at least Algebra I in grade 9 and ending with Algebra III, Trigonometry, Pre-Calculus or a mathematical analysis course in grade 12.

Three years of college-prep, lab-based science courses with students doing frequent labs and using these labs as a basis for gaining understanding of science concepts, facts, classification systems and other essential knowledge.

Three years of social studies that require students to do frequent reading and writing about both historical and contemporary events.

Require computer proficiency with a variety of software, such as word processing, database, spreadsheet and presentation packages, e-mail and Web-based research. Expect students to use computers and software to complete assignments in both academic and career/technical classes throughout high school.

Student achievement can be increased even more if students take an intensive concentration in mathematics and science, humanities or in a planned sequence of career/technical courses. A mathematics or science concentration can elevate the achievement of many students from low-performing high schools to the point that they can pursue further education in fields that can lead to employment in areas with a strong mathematics and science base. Students who complete a humanities concentration also have higher achievement than students who do not complete a concentration.

A career/technical concentration raises student achievement when it is aimed at advancing students' technical literacy and knowledge by having them read and interpret technical materials and draw upon their mathematics, scientific and technical knowledge and skills to complete challenging assignments. Students can complete a career/technical concentration through a high school, a community or technical college or in a planned work-site learning. The concentrations are described in the following box.

Recommended Academic and Career/Technical Concentrations

- A mathematics and science concentration includes four or more credits each in mathematics and science courses with at least one credit at the Advanced Placement level;
- A humanities concentration includes four credits each in college-preparatory/honors English and social studies with at least one course at the Advanced Placement level, and four more credits drawn from foreign language, fine arts, journalism, debate or additional advanced-level courses in literature, history, economics, psychology or other humanities area;
- A career/technical concentration consisting of at least four credits in a planned sequence of quality career/technical courses in a broad field of study with students meeting standards on an external assessment.

Students can also attain this level of rigor through completion of an International Baccalaureate.

An analysis of graduating seniors in 2001 at 25 rural Making Schools Work [3] sites reveals that the two highest achieving groups of students are those who take a solid academic core and either more academics or a planned sequence of at least four career courses. *(See Table 8.)* The highest-achieving group of students in a NAEP-like exam was the 10 percent completing four years of mathematics and science with at least one mathematics course at the pre-calculus level or higher. These students had average scores at the proficient level in reading and mathematics and at the basic level in science. The second highest-achieving group was the 15 percent completing the *HSTW*-recommended academic core and a series of four courses in career studies. These students had average scores in reading that were at the proficient level with mathematics and science scores at the basic level. The third highest-achieving group of students was the seven percent completing a basic college-preparatory core of at least three mathematics credits that included algebra, geometry and Algebra II and three science credits. These students were at the basic level in reading and mathematics and below basic in science.

Table 8

Achievement of Students Completing Different Programs of Study at Making Schools Work Sites in 2001

Program of Study	% of students	Average Scores		
		Reading	Mathematics	Science
Completed mathematics and science	10%	299**	328**	321*
HSTW academic core and career focus	15	291**	318*	309*
Basic college preparatory	7	285*	304*	295
Career studies with low academic core	46	271*	294	279
Low academic core and no career focus	26	258	282	267

Note: Percentages in the columns may add up to over 100 due to some students being counted in more than one program of study.

Scores without asterisks are below basic. * At basic level. ** At proficient level.

The proficient and basic levels in the *HSTW* exams have been referenced to the national NAEP exams.

The largest percent of the students at these schools (46 percent) completed a sequence of low-level academic courses with at least four courses in a career sequence. Only in reading were they at the basic level; they were below basic in mathematics and science. The lowest-achieving group of students (26 percent) completed low-level academic courses and failed to complete a sequence of at least four courses in career studies. These students

[3] Making Schools Work is an OERI-funded effort to help rural high schools adopt a modified version of the *HSTW* model to improve achievement of all students in the high school and in their feeder middle grades schools. *Table 8* provides baseline data collected on first-year schools

had average scores in reading, mathematics and science below basic. Increasing the percentage of students at these schools completing a solid academic core and taking either more academic courses or a planned career sequence would improve student achievement.

Thirty-four percent of 50,000 career concentrators participating in the 2000 *HSTW* assessment had completed the *HSTW*-recommended academic core and a planned sequence of career studies. (This percentage would have been higher if more schools had enrolled students in the recommended college-preparatory language arts curriculum.) These students were three times more likely to meet the reading and mathematics goal and two and half times more likely to meet the science goal than were students who did not complete the recommended core. *(See Table 9.)* In 2000 the average scores for students who completed the curriculum exceed the *HSTW* performance goals in all areas while those who did not complete the curriculum had average scores that were below all goals. *(See Table 10.)*

Table 9
Impact of Completing the *HSTW*-Recommended Curriculum on Students Meeting Performance Goals
% Equals Students Who Met Performance Goals
Source: 2000 *HSTW* Assessment Data

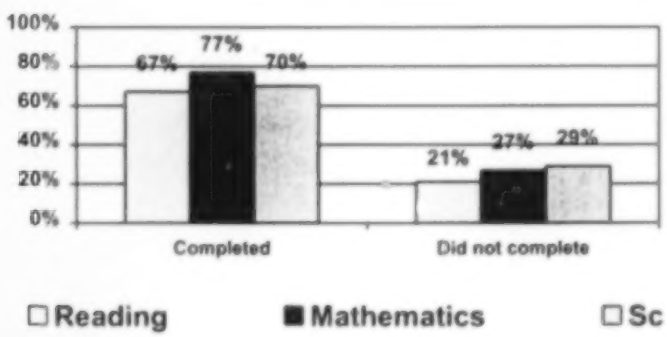


Table 10
Average Scores of Students Who Completed and Did Not Complete the Recommended Curriculum

	Completed	Did Not Complete	*HSTW* Goal
Reading	286	270	279
Mathematics	310	294	295
Science	300	284	292

Source: 2000 *HSTW* Assessment

To be successful in getting more students through a solid academic core and either more academics or a career concentration, several other changes in school and classroom practices are necessary.

Setting High Expectations

Improving student achievement involves more than requiring students to take courses with the "right titles." If the courses lack the necessary rigor, little progress will be made. To create a culture of high expectations, school leaders must define and communicate standards and be persistent in helping students meet them. Schools that make the most progress have teachers who make challenging assignments, set criteria for the amount and quality of work for a passing grade, and require students to redo work until it meets standards. The schools expect students to work hard both in and out of class to complete assignments that count. A higher percentage of students who reported having all of these experiences met performance goals on the *HSTW* assessment than did students who had only some or none of the experiences. *(See Table 11.)* In 2000 there were 52 *HSTW* sites in which 85 percent of the students met at least two of our three achievement goals in reading, mathematics and science. We contrasted these 52 schools with 38 high schools who had students with similar socioeconomic and racial backgrounds. Only 36 percent of the students at the comparison schools met the reading goal compared with 86 percent at the high-performing schools. Fifty-eight percent met the mathematics goal compared with 91 percent at the high-performing schools, and 48 percent met the science goal compared with 87 percent at the high-performing schools. *(See Table 12.)*

Table 11
Impact of High Expectations on Student Performance
Source: 2000 *HSTW* Assessment

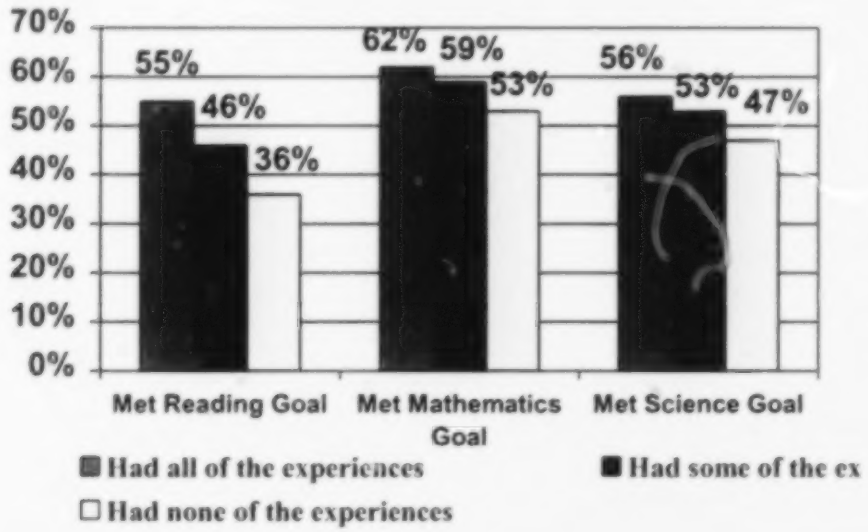


Table 12
Percentage of Students Meeting the Performance Goals at High-Performing and Comparison Schools

	Reading	Mathematics	Science
High-performing schools	86%	91%	87%
Comparison schools	36	58	48

Source: 2000 *HSTW* Assessment

The high-performing schools differed in several important ways in the quality of experiences they provided their students. First, a much higher percent of their students completed the *HSTW*-recommended curriculum than the students at the comparison schools. *(See Table 13.)* For example, 64 percent of the students at the high-performing schools took four years of college-preparatory/honors English compared with 35 percent at the comparison schools. In mathematics, 97 percent of students at high-performing schools compared with 73 percent at the comparison schools took the curriculum recommended by *HSTW*. The difference in science course-taking patterns was equally dramatic, with 77 percent of the students at high-performing schools completing the curriculum while only 44 percent did so at the comparison schools.

Table 13
Percent of Students Completing the *HSTW*-Recommended Curriculum At High-Performing and Comparison Schools

	High-Performing Schools	Comparison Schools
English	64%	35%
Mathematics	97	73
Science	77	44

Source: 2000 *HSTW* Assessment

Helping Students Meet the Challenge

High expectations alone will not get the job done. In fact, **if higher expectations are not accompanied by more intensive support for struggling students,** many more will be unsuccessful. The tendency is to either fail students or socially promote them even though they have not really passed. Neither approach is an acceptable alternative for both set the students on a course of failure. The only alternative is a set of intervention strategies that result in students meeting standards.

Schools that improve mentor, coach and re-teach students to meet higher standards. They find the extra time needed for students to meet achievement goals. Extra help may take the form of a support class with a nurturing teacher who teaches students how to study, organize their time, and learn in teams with other students. Extra help can occur before, during and after school and on Saturday and often involves tutoring and coaching by teachers or advanced students. Effective schools make parents aware of the extra-help program and enlist their support. They also require failing students to participate. These are new concepts for low-performing schools. As long as students take "watered-down" courses, they do not realize they are falling behind. It is only when a school decides to teach all students to the same high standards that students and parents see the need for extra help.

In the study of the 52 high-performing *HSTW* sites and their 38 counterparts cited earlier, not only did the high-performing schools enroll more students into more demanding courses, but their students perceived that the school had a greater commitment to give them the extra help they needed to meet higher course standards. For example, 72 percent of the students from high-performing schools said their teachers were available most of the time to help them meet course standards compared to only 55 percent at the comparison schools. It appears that high performing schools value career-oriented students. Providing them the extra help needed tells students that the school cares about them and that learning is important.

Rethinking the Purpose of Career/Technical Studies

Career/technical teachers who make the purpose of high school career/technical studies to produce graduates who are technically literate add value to academic achievement. In a changing, highly technical world, we can do no less than make this the driving purpose of high school career/technical programs. There are compelling reasons why educators need to rethink the purpose of career/technical programs. Since more than half of all career/technical students will pursue postsecondary studies, they must receive a strong academic foundation. The new economy requires much higher levels of technical literacy than ever before. Students must be prepared to:

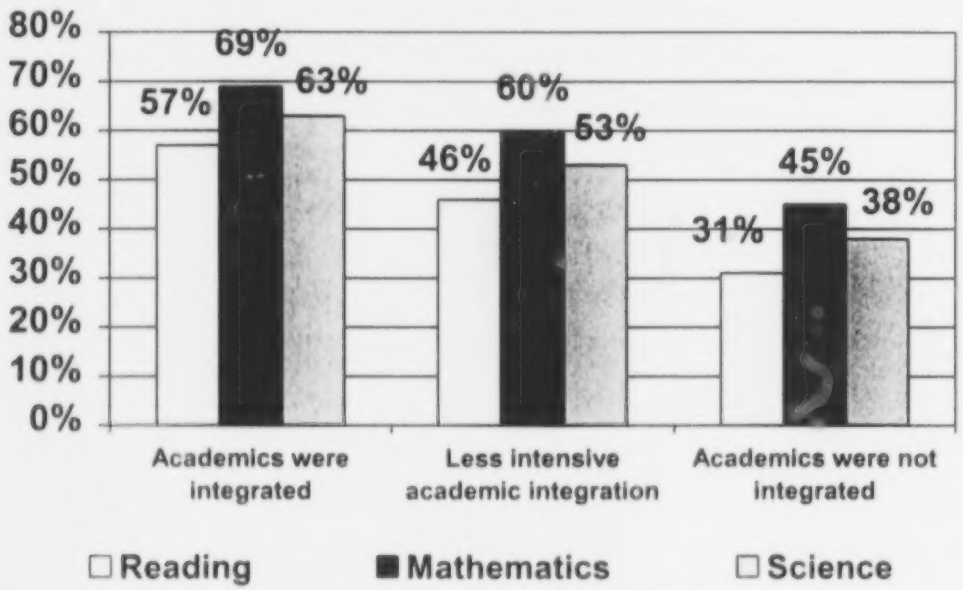
- Read, understand and communicate in the language of a career field;
- Use mathematics and reasoning skills to solve problems;
- Understand technical concepts, principles and procedures;
- Use basic technology.

HSTW data has consistently shown that students who experience integrated academic and technical content in their career/technical classes achieve at a higher level than students who do not. The higher-achieving students have career/technical teachers who:

- Place a great deal of importance on assignments that require students to read, write and use mathematics; and
- Require students to use mathematics, read technical manuals and books, and use computers daily or weekly in completing career/technical assignments. *(See Table 14.)*

Table 14

Impact on Student Achievement of Career/Technical Courses That Integrate Academic Content and Skills



% Equals Students Who Met *HSTW* Performance Goals
Source: 2000 *HSTW* Assessment

The data show that the 17 percent of career/technical students who were engaged in rich instructional assignments that required them to use academic skills to complete their work were more likely to meet *HSTW* achievement goals than students who experienced less intensive or no integration of academic content. If we want high school career/technical program graduates who can use academic skills to complete authentic-work, then we must have teachers with a strong academic and technical foundation, who know how knowledge and skills apply in work settings, and who are accountable for advancing students' technical literacy achievement. These teachers must have a repertoire of instructional methods that they can use in planning and engaging students in assignments that require them to draw upon both their academic and technical knowledge to complete assignments. This will require a restructuring of the preparation and certification programs for career/technical teachers.

Offering High Quality Structured Work-Site Learning

More than two-thirds of all high school students work during their senior year. However, career/technical students are four times more likely than general students to be in a school-

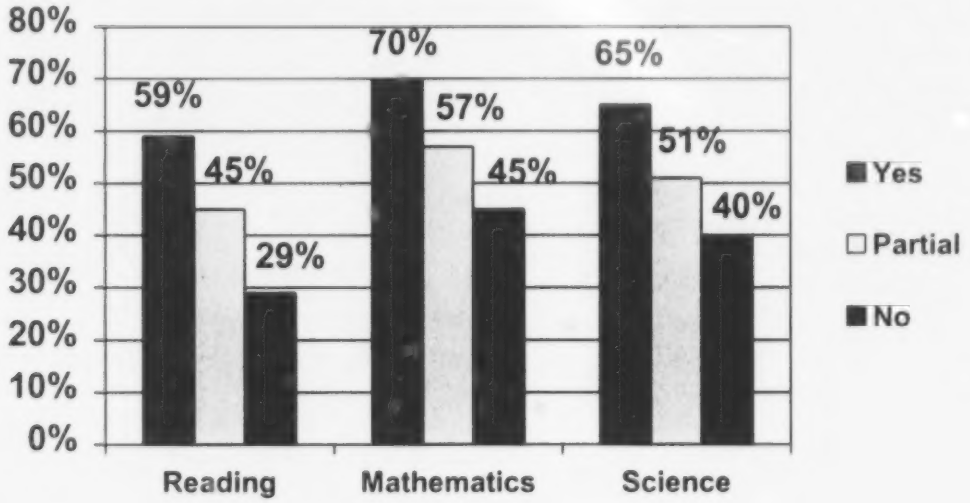
sponsored work program and eight times more likely than are college-preparatory students. A 1997 survey of employers showed that they found that front-line workers who had participated in school-sponsored work-based learning in high school had better attitudes and productivity than did employees who missed those experiences. The 2000 *High Schools That Work* Assessment showed that the following quality work-based learning experiences are associated with higher student achievement:

- Observing veteran workers in certain jobs;
- Learning how to do a job from a work-site mentor;
- Being evaluated according to clear standards;
- Receiving encouragement from a work-site mentor at least monthly to develop strong work habits and good customer relations skills;
- Being shown daily or weekly how to use communication skills at the work site.

Students who had all of these experiences were much more likely to meet *HSTW* achievement goals than were students who had only some or none of these experiences. *(See Table 15.)* Making the effort to obtain quality work-site learning experiences for students matters.

Table 15

Impact of Quality Work-based Learning Experiences on Student Achievement



% Equals Students Who Met *HSTW* Performance Goals

Source: 2000 *HSTW* Assessment

Quality high school career and technical classes play a significant role in helping students see the connection between academics and real-world applications and set future career goals. Students who are given the required technical literacy skills can expect to find better jobs, earn more and are more likely to continue and succeed in further education.

Adopting a Flexible Schedule

Low-performing schools make more progress when school leaders and teachers have the freedom to create a flexible schedule that enables students to earn up to 32 credits in high school rather than the traditional 24-credit program. Students who are behind will never catch up by making the same or less effort than is expected of our best students.

By the end of the first nine weeks of Algebra I, every good teacher knows which students are "getting it" and which are not. Yet in the traditional scheduling structure, it takes students 36 weeks to fail the course. Mathematics departments with the flexibility to reschedule failing students into re-teach classes at the end of each nine-week period have seen their mathematics scores rise significantly and failure rates decline.

Many schools are adopting a semester-block schedule where students only take four classes each semester, giving them the opportunity to complete eight credits each school year. This approach has a number of advantages. It means teachers have only three preps instead of the traditional five so they can do a better job of planning effective instruction for each class. With fewer students, they can get to know more of them on a personal level. In addition, with longer class periods, there is more time for the kinds of student-centered active learning approaches that research shows are most likely to engage and motivate students in learning. Many principals can show that the adoption of more flexible scheduling contributes to improved student achievement and fewer course failures and dropouts when graduation requirements rise and instruction changes to make good use of the additional focused teaching and learning time.

Schools in the *HSTW* network that made the greatest gains between 1998 and 2000 in reading, mathematics and science achievement were high schools that had gone to a semester-block schedule and required students to complete four years of mathematics and science and 24 or more credits for graduation. *(See Table 16.)*

Table 16
Gains in *HSTW* Assessment Scores between 1998 and 2000
Comparison of *HSTW* Sites with Traditional and Block Schedules

***HSTW* Assessment Tests**	**Traditional (20 to 23 credits)**	**Block Schedule (20 to 23 credits)**	**Block Schedule (24 to 30 credits)**	**Block Schedule (24 to 30 credits) Required 4 mathematics and science credits**
Reading gains	0 points	0 points	2 points	6 points
Mathematics gains	3 points	2 points	4 points	7 points
Science gains	2 points	1 point	5 points	7 points

Source: *HSTW* Assessment, 1998 and 2000

Adopting a flexible schedule is essential if low-performing schools are going to require students to complete the recommended upgraded academic core and either more high-level academics or a career concentration. Yet some large urban school districts are tying the hands of educators who would like to make this move by not allowing one school to adopt a different schedule than others in the district. This "one-size-fits-all" mentality hinders implementation of essential curriculum and instructional changes at schools at the forefront of reform.

Changing How Teachers Teach

If students are to meet high standards, they need teachers who know their subject matter and who know how to use diverse strategies that can relate content to students' lives. Most high school principals in states that use end-of-course exams are discovering that their "best" teachers can teach challenging content to low-performing students in ways that will raise achievement significantly. *HSTW* has found that achievement at low-performing schools improves as more students report having more adult-like learning experiences in the classroom. These experiences include: 1) having teachers who relate classroom learning to real life; 2) participating in cooperative study groups in which students are held accountable for helping each other learn; 3) using technology to complete challenging assignments; 4) going "on stage" to demonstrate new knowledge; and 5) using subject-matter content to solve authentic real-world problems.

Many teachers do not know how to teach in this way. There is a critical need for schools to find time for teachers to learn: how to move standards into practice; new methods; how to plan challenging assignments aligned to standards that engage students so that they will see the value of what they are learning in their own lives; and how to develop and use classroom assessment to evaluate student learning and effectiveness of instruction.

Emphasizing Literacy and Mathematics Across the Curriculum

High schools raise achievement when they make literacy – reading and writing for learning – a priority across the curriculum. School leaders who prepare all teachers to engage students in reading and writing find that student achievement increases both in language arts and in other courses. Schools that set standards for the amount and variety of reading and writing that students are expected to do in all courses – mathematics, science, social studies, career/technical and others – will have higher-achieving students.

Students participating in the 2000 *HSTW* assessment were categorized according to the variety of literacy experiences they reported. The following experiences were included in the evaluation:

- Often use word processors to complete assignments;
- Often revise essays or other written work to improve quality;
- Sometimes/often write in-depth explanations;
- Complete short writing assignments (1 – 3 pages) at least monthly;
- Sometimes/often discuss with other students what I read in English class;
- Read a book outside of class and demonstrate understanding at least monthly;
- Spend two or more hours reading outside of class each week;
- Read technical books/manuals to complete vocational assignments at least monthly.

Students reporting having only 0-2 of these experiences were considered to have had little experience; those with 3-5 had moderate experiences; and those with 6-8 had intensive experiences. Students who had intensive literacy experiences across the curriculum had reading scores that were 23 points higher than students with little literacy experience. Their scores were in the upper range of the basic level. Students with a moderate amount of experiences had scores that were 12 points higher than those with the fewest experiences but 11 points behind those who had the most and were below the *HSTW* goal of 279. The students with little literacy experience had scores that were barely within the basic level. *(See Table 17.)*

Table 17

Impact of Certain Literacy Experiences Across the Curriculum on Reading Scores

	Average Reading Scores
Little literacy experience	263
Moderate literacy experience	275
Intensive literacy experience	286

The intensity of students' literacy experiences across the curriculum was determined by students reporting whether or not they had the following experiences.

1. Often use word processor to complete assignments.
2. Often revise essays or other written work to improve quality.
3. Sometimes/often write in-depth explanations.
4. Complete short writing assignments (1-3 pages) at least monthly.
5. Sometimes/often discuss with other students what I read in English class.
6. Read a book outside of class and demonstrate understanding at least monthly.
7. Spend two or more hours reading outside of class each week.
8. Read technical books/manuals to complete vocational assignments at least monthly.

Little equals 0-2, moderate equals 3-5 and intensive 6-8 experiences

Reading basic level is 262. Proficient is 288. Advanced is 317.

Using the 2000 *HSTW* database, it is possible to predict the experiences that would result in 85 percent of the students meeting the *HSTW* reading goal. Having all career-oriented students complete a college-preparatory/honors English curriculum would result in 69 out of 100 students meeting the reading goal. This would be an increase of 19 percent over the number of students currently meeting the reading goal. The percent of students meeting the reading goal would increase to 88 out of 100 if, in addition to completing four years of academic/honors English, students were expected to: 1) read and interpret materials and technical books and manuals at least weekly to complete assignments in their career classes; 2) complete short writing assignments at least weekly in all their classes; 3) read several books annually and demonstrate understandings of them; 4) read two hours or more each week outside of class; and 4) use word processing frequently to complete homework assignments.

Although African-American students participating in the *HSTW* assessment on average have lower achievement than the average for all students, the number meeting the reading goal could also reach 85 percent. This could happen if the students were provided the experiences noted above and increased the amount of reading outside of class to four hours per week. The message is simply this: To close the reading achievement gap requires greater

effort by schools and students across the curriculum, and, for some students, expert help with reading will be needed.

By the same token, schools that emphasize mathematics across the curriculum help students see applications to their other courses. Again using the *HSTW* 2000 database, it is possible to project the mathematical experiences in high school that will result in 85 percent of the career-oriented students meeting the *HSTW* achievement goals. Having all career-oriented students complete college-preparatory-level mathematics courses including two from Algebra I, geometry, or Algebra II, plus enroll in a career/technical class in which they use mathematics daily or weekly to complete class assignments would result in 83 students out of 100 meeting the *HSTW* mathematics goal. Eighty-five out of 100 African-American students will meet the *HSTW* mathematics goal if they complete algebra before grade nine, take four years of mathematics in high school, including either pre-calculus or Algebra III/trig and enroll in a career/technical class where they use mathematics frequently to complete assignments.

High schools that are serious about giving minority students an opportunity to compete for jobs that require a mathematics base should ask these students to complete at least four years of mathematics in high school. Those who have not completed algebra in the middle grades will need to double their mathematics instructional time in grade nine so that they can complete "real " Algebra I by the end of grade nine.

Individuals who acquire high-level mathematics and reading skills are reported to earn substantially more than individuals who complete the same level of schooling but fail to acquire such knowledge. Too many high schools relegate reading to language arts classes and mathematics-to-mathematics classes.

Providing Guidance and Advisement

Many high schools have become large impersonal enterprises where students, especially those who are struggling, can become lost. One way to personalize the school environment is to assign an adult adviser who will remain with each student throughout high school. Students who receive effective guidance and advisement services greatly increase their chances of completing a challenging academic core and meeting performance goals in reading, mathematics and science compared to students without such services. Effective guidance and advisement includes:

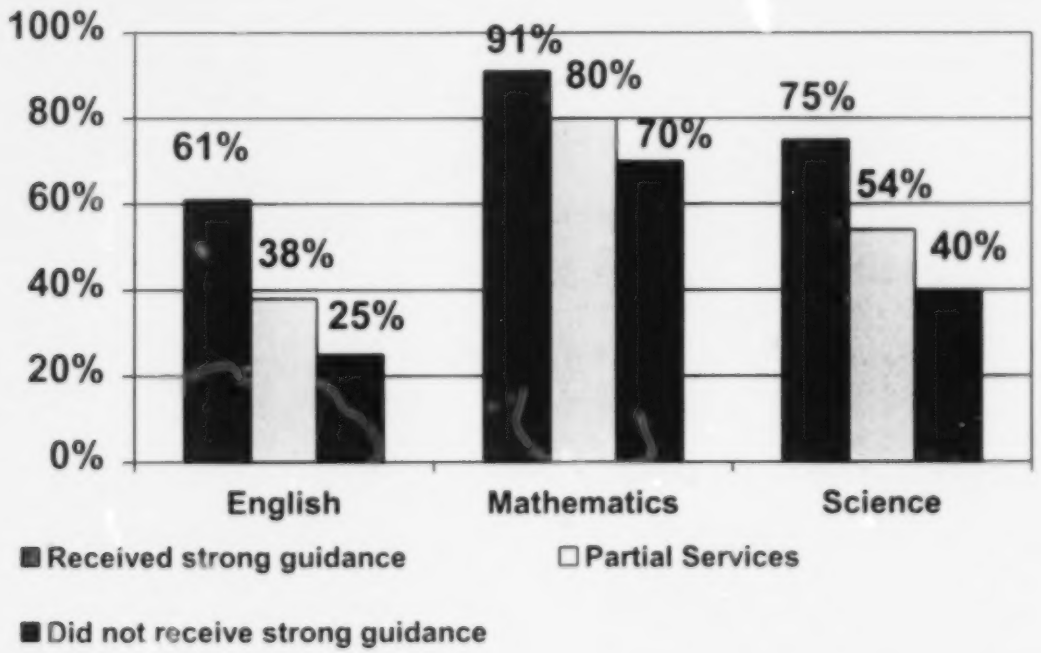
- Encouraging students to take more challenging mathematics and science courses;
- Helping students plan a high school program of study at least by the end of grade nine;
- Involving parents with their children in planning a high school program of study; and
- Providing information and guidance about post-high school studies.

HSTW assessment data for 2000 show students who reported receiving all of these guidance services were much more likely to complete the *HSTW*- recommended academic

core curriculum. In fact, the percentage of these students completing the recommended curriculum ranges from a high of 91 percent in mathematics to 61 percent in language arts. For students who did not receive all of these services, chances of completing the recommended curriculum are greatly reduced and drop as low as 25 percent for language arts. *(See Table 18.)* Good guidance and advisement results in students taking the right courses and taking the right courses results in higher achievement. Students who reported that they received strong guidance support were 20 to 30 percent more likely to meet achievement goals with approximately two-thirds or more of these students meeting the goals.

Students who view high school as a way to achieve post-high school goals are more motivated than students with no goals or students who cannot see the connection between their goals and their high school studies. Effective guidance and advisement programs help students to base their goals on an accurate understanding of their strengths and weaknesses and provide information and encouragement from an adult advocate who makes sure they get extra help as needed.

Table 18
Impact of Strong Guidance on Completing the *HSTW*-Recommended Curriculum
Source: 2000 *HSTW* Assessment



Increasing Parent Involvement

Parents are essential partners in improving low-performing schools. Parents of high school students often appear to be uninterested and disengaged. To reverse this situation, high schools must take a far more personalized approach to parent/school relationships than has been the case in the past. One effective strategy that more and more high schools are adopting is an annual meeting of the student, parents and adviser to set goals for the student and develop a plan of study to accomplish the goals.

This is best accomplished when the school has implemented some type of adviser program as described above. For some parents, the initial meeting is through a home visit. The visits help establish an early bond that can be strengthened through continuing communication. *HSTW* data show that students whose parents are involved in planning their programs of study and who continue to be involved in their children's education have higher achievement than students who do not have such involvement. Between 1994 and 2000, the percentage of students at *HSTW* sites who said they met with their parents and school representatives to develop four-year programs of study increased from 19 percent to 34 percent. Six *HSTW* states – Indiana, North Carolina, Ohio, South Carolina, Tennessee and West Virginia – require schools to assist all students in developing four-year programs of study. More students at *HSTW* sites in these states than in other states report getting help before the end of grade nine in planning what they will study in high school.

Strengthening Transitions

As high school graduation requirements rise, many students enter high school unable to do rigorous college-preparatory work. The failure rate in grade nine is three to five times higher than the rate in any previous grade. Low-performing schools that are making progress in raising student achievement are addressing the transition from the middle grades to high school by focusing on the types of students who traditionally have been enrolled in "watered-down" academic courses and taught by the weakest teachers. The goal is to get more students to complete two college-preparatory language arts courses, algebra and geometry, and two college-prep science courses by the end of grade 10. Some approaches that are being used to help improve the transition from middle grades to high school for more students include:

- Identifying seventh-graders who will not be ready for high school, providing them with more intensive studies in
- language arts, reading and mathematics in grades seven and eight, and orienting them and their parents to new
- high school standards;
- Offering summer catch-up programs to entering high school students who are still behind to help them be better prepared for the next step;

- Having students who enter high school unprepared for college-prep Algebra I and English to complete two years of language arts/reading and mathematics courses in grade nine;
- Providing a support class to help students learn how to manage their time, study correctly and achieve their goals; and
- Arranging for teams of core academic teachers to teach these students and provide them time to plan together under the leadership of a master teacher.

HSTW has found that these strategies work in reducing failures and raising student achievement.

In a study of 3,000 students transitioning from middle grades to high school, *HSTW* found that schools which enroll a much higher percent of their ninth-grade students in college-preparatory-level language arts, mathematics and science courses have a success rate that is comparable to schools which enroll fewer students in these courses. Many of these schools are being successful by adopting a mastery approach in which students who fail to "get it" the first time are re-taught, increasing the amount of instruction time and providing an extensive system of extra help. For example, a group of schools that enrolled 56 percent of their ninth-graders in college-preparatory English had 86 percent of them earn a C or higher grade compared to schools who only enrolled 25 percent of their students in college-preparatory English and had 91 percent of those students make a C or higher grade. *HSTW* found that students in the lower half of the reading achievement scale in grade eight were twice as likely to fail English if they were enrolled in a low-level English course than if they were enrolled in a high-level English course. Only students with mathematics and science achievement in the bottom quartile had a slightly higher failure rate in grade nine if they were enrolled in college-preparatory-level courses in mathematics and science versus low-level courses. For all other quartiles, the failure rate was less if students were enrolled in the more demanding mathematics and science courses. *(See Tables 19, 20 and 21.)*

Table 19

Percentage of Ninth-Grade Students Earning a D or an F in English Courses by Reading Achievement Quartile At End of Grade Eight

	Quartiles			
	Low 25%	**2**	**3**	**Top 25%**
College-Prep English 9	21%	16%	10%	3%
Lower-level English 9	47	31	32	8

Source: 2001 Making Middle Grades Work Follow-Up Study

Table 20

Percentage of Ninth-Grade Students Earning a D or an F in Mathematics Courses by Mathematics Achievement Quartile At End of Grade Eight

	Quartiles			
	Low 25%	**2**	**3**	**Top 25%**
College-Prep Mathematics	47%	31%	16%	9%
Lower-level Mathematics	41	37	25	16

Source: 2001 Making Middle Grades Work Follow-Up Study

Table 21

Percentage of Ninth-Grade Students Earning a D or an F in Science Courses by Science Achievement Quartile At End of Grade Eight

	Quartiles			
	Low 25%	**2**	**3**	**Top 25%**
College-Prep Science	48%	23%	13%	5%
Lower-level Science	44	33	16	8

Source: 2001 Making Middle Grades Work Follow-Up Study

The transition from the middle grades to high school is not the only "trouble spot." The transition from high school to postsecondary studies is of equal concern. Too many high school graduates spend the first year of college taking non-credit remedial courses or are unable to pass employers' exams for good jobs. Too many high schools allow seniors to "coast" through grade 12 instead of requiring them to prepare for postsecondary study and work.

Schools can make the senior year a more meaningful experience by helping students complete an upgraded academic core and a concentration, as recommended by *HSTW*. In fact, students at low-performing schools who take four mathematics courses and four science courses improve their chances of exceeding the performance goal on the *HSTW* assessment's mathematics and science exams.

HSTW data confirms how much it matters that students take algebra by the end of grade eight and a mathematics course in the senior year. Career students who take algebra by the end of grade eight have significantly higher mathematics achievement as graduating seniors than do students who take algebra later. SREB-Making Middle Grades Work initiative has urged states to require all students to complete either algebra or pre-algebra by the end of grade eight, taught by a qualified mathematics teacher. The number of students who complete algebra by the end of grade eight increased from 35 percent in 1998 to 40 percent in 2000 at *HSTW* sites participating in the assessment. *(See Table 22.)*

Table 22

Career/Technical Students Mathematics and Science Performance at HSTW Sites By Courses Taken

	Took course		Did not take course	
	Percent of students	Average score on *HSTW* Assessment	Percent of students	Average score on *HSTW* Assessment
Algebra by the end of grade eight	40%	307	60%	295
Mathematics in grade 12	62	302	38	296
Science in grade 12	52	293	48	286

Source: 2000 *HSTW* Assessment

The SREB report *Reducing Remedial Education: What Progress Are States Making*? notes that "students who skip mathematics in their senior year are out of practice when they enter college and, not surprisingly, often need refresher courses." The report also says that evidence from SREB states "suggests that students are less likely to need remedial courses if they complete a core of challenging academic courses in high school and take a high-level mathematics course in the senior year." Further, the 57 percent of students at urban *HSTW* sites who completed four years of mathematics had an average mathematics score that met the *HSTW* goal.

Low-performing schools make the greatest gains in student achievement when they take the following actions affecting the senior year of high school:

- Increase the percentage of students who complete a career concentration and spend half of their time in grade 12 in core academic subjects, with at least one of those courses being in high-level mathematics.
- Arrange for a local community or technical college to give placement exams to students in grade 11 and use the results to advise students and their parents about taking courses in grade 12 to prepare for employment and postsecondary study.
- Work with postsecondary institutions to improve 12th-grade language arts and mathematics courses and increase the amount of time students spend in these courses.
- Allow students to earn postsecondary credit for academic and career/technical classes only when students pass an external exam, such as an Advanced Placement exam or an exam given by the college for the same courses.
- Many schools require students to complete a senior project in which they apply everything they have learned in high school to a chosen topic. These projects involve:

- A written research paper that adheres to standards set by language arts teachers;
- A major product or a community-based service; and
- An oral presentation to a group from the school and the community.

Keeping Score and Using Data

Students, teachers and parents know that the school is serious about improving achievement when it puts emphasis on keeping score. If the school's mission is to produce more graduates who can continue in postsecondary study without taking remedial courses and can pass employers' exams for good jobs, they must collect and publicize data on the progress they are making in fulfilling this goal. Inviting students back that did and did not reach this standard to share differences in their high school experiences will begin to paint a picture of what works and what does not work. At the same time, data on course pass rates, performance on standardized tests and on end-of-course exams, and on attendance and absences – disaggregated by ethnicity, sex and major skill area – will present a clear picture of the progress being made and of the students who are behind. Surveys that connect students' classroom experiences to achievement are other sources of meaningful information.

Keeping score will focus the school leadership, teachers and parents on school and classroom practices that work while eliminating those that do not. This is a characteristic that separates low-performing high schools that have become high-performing schools from those that fail to improve.

Conclusion

The **federal government** has focused national attention on the critical need to develop a comprehensive approach to school improvement. **Many states have responded by implementing tougher graduation requirements and strong accountability policies. Federal and state support has helped** a limited number of low-performing students and schools to improve. **Many more still need such support.** As we consider the impact of school-improvement efforts to date, it is important to explore how best to expand and extend what has been started. To move forward, serious consideration must be given to how to:

- Align federal, state and local goals, policies and resources to achieve comprehensive school improvement.
- Get assessment and accountability systems to focus on school and classroom practices that work best for advancing the achievement of all groups of students.
- Develop the capacity of current and aspiring leaders who can address the core functions of the school that affect student achievement.
- Make proven research-based conditions and practices the underpinnings of academic and career/technical studies in high school.
- Improve transition from middle grades to high school and from high school to postsecondary education.

- Address the critical shortage of teachers in some discipline fields and prepare a new generation of career/technical teachers.
- Refocus career/technical education to prepare high school graduates with a strong academic foundation and high levels of technical literacy.
- Expand access to quality career/technical programs especially in communities with some of the most pressing needs.

The effort to improve our nation's public high schools is our most challenging task. For 45 years, I have been waiting on high schools to get better by fixing the early years of education. High schools, as they now exist, often undo the good work that was done in earlier grades. You fix high schools by focusing on high schools.